

Service Mix Model For Older People



July 2008

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Executive Summary

System modelling is a part of CMDHB's Older People's Strategy "to plan future services for older people by developing a system dynamic model focusing on the coordination and integration across the continuum of services to ensure the variety and capacity of services meet their assessed needs".

This model has been determined using available information within CMDHB and operational and management staff have been consulted in its development.

Because some variables have either already been committed, or are essential to the system, the following have been included in the initial basic run (see 6.1).

- § Enhancing the NASC capacity to assess need on presentation
- § Providing education to home-based staff on the importance of maintaining activity in the home for older people
- § Additional 13 AT&R Beds in 2009 and 26 in 2010.

The other variables tested include:

Variables Run in the Model	Impact on Cost	Impact on Client Health
Providing extra carer support for home-based clients	High with high investment long term	High
Enhancing the NASC capacity to (re)assess need to ensure appropriate service	Negative initially but Low long term	Medium
GP education to ensure they are aware of NASC and how to refer patients	Neutral	Low
Advanced care planning for all patients aged over 65 years	Medium to High	Low to Medium
Increases in community support for AT&R patients	Negative with significantly more clients served	High or Medium
Increases in community support for MHSOP clients	High	High or Medium
The reorganisation of one specific ward for older people within the hospital(from within existing resources), staffed by an additional geriatrician and nurse	High	Medium or High
Provision of a community geriatric service to support primary care	Low to Medium	Medium or High
Enhanced access to Chronic Care Management (CCM)	Neutral	High

Three combinations of all the scenarios have been developed. In the “worst case”, all the most conservative views on the impact of variables have been used. The “best case” has included all the most optimistic views.

Identified in the table below are the overall costs of the scenarios (with 2.6% inflation on costs every year). There are some small savings quickly and significant long-term savings from all the scenarios.

Total Annual Costs of Scenarios								
(Costs in 000) End of Year	2006	2007	2008	2009	2010	2015	2020	2025
Base Run	\$126,534	\$135,380	\$142,525	\$147,563	\$155,367	\$191,900	\$225,327	\$265,733
Worst Case	\$125,137	\$129,046	\$132,035	\$135,928	\$144,137	\$180,637	\$213,069	\$251,383
Most Likely	\$123,215	\$116,925	\$116,178	\$120,469	\$130,013	\$173,084	\$203,270	\$234,016
Best Case	\$123,981	\$116,003	\$108,803	\$108,939	\$119,298	\$158,521	\$189,538	\$223,648

The model has also shown clearly the intensive need for workforce increases in home-based care and residential care over time.

The model is now ready to be explored by the sector and service users. Ongoing discussion is needed to ensure the model is used effectively as a tool for service development.

1. Introduction

The health needs analysis by Dr G Jackson and Dr J Wall in 2006 indicates that significant growth is expected in the over-65 population and in particular those aged over 75 and 85 between 2006 and 2026. The number of people over 85 within the CMDHB area will nearly treble from 4,090 (0.9% of total population) to 11,270 (1.9%) in 2026. This is a 176% increase.

There is currently 3.9% of the total Counties Manukau population in subsidised residential care. There is pressure on this proportion to increase from an ageing population, but the impact will be mitigated by the strong trend towards supporting people in their own homes ('ageing in place' is the basis of the Counties Manukau Health of Older People (HOP) Action Plan). Currently 77% of all CMDHB HOP expenditure is on external residential care.

CMDHB is already committed to sharing information on occupancy, demographic trends, service user preferences, and DHB funding plans and long-term partnerships with stakeholders in its open market approach to residential care.

The service mix planning model is designed to provide a shared planning tool for all key stakeholders to provide information that indicates expected future preferences of service users and funders. It covers all modes of support, including home-based, community support, supported housing and residential care, and hospital-based care.

The model can be developed further to identify more precisely the current and target proportion of the older population that is supported by each type of service, and how current delivery patterns compare with service needs. It will allow interactive modelling over time to test how different factors improve efficiency, effectiveness and equity.

The model includes variables that change or remain static regardless of CMDHB actions, those that can be influenced by CMDHB and those that are based on CMDHB's view of best practice.

2. Methodology

This project first developed a strategic inter-agency Steering Group to oversee the model-building process and then identify model goals, parameters and principles.

Following this, an operational group was formed to develop and test assumptions about the main model elements, concentrating on service pathways.

The Steering Group specified and agreed the model structure before the process, variables to be used and the funding flow between services were mapped.

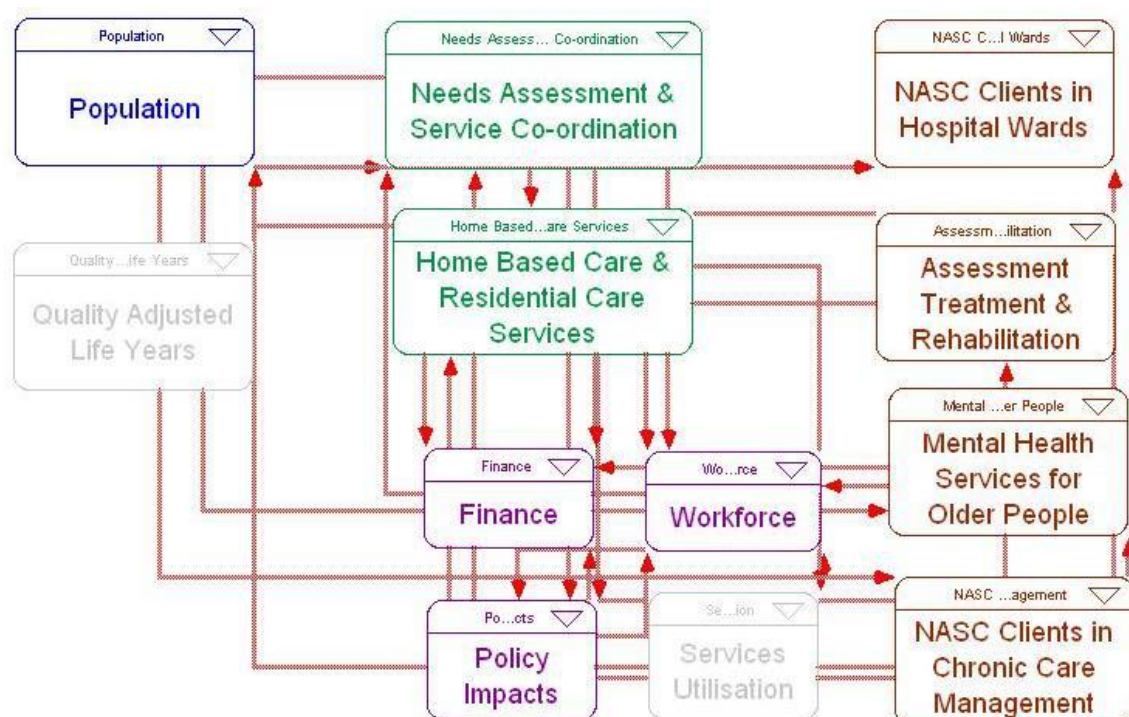
The detail of the model was then developed, consulting a range of operational staff, using proxy measures as needed. All base data is from 2006.

The model has been tested with the Steering Group and key operational staff. Scenarios involving the different key variables have been run to identify the impact of each independently and in combination with others.

It is important to note that Quality-Adjusted Life Years (QALY) have not been included in this model (shown as the gray coloured box on the graph below) because of the level of complexity involved in determining them. QALY are a way of measuring both the quality and the quantity of life lived, as a means of quantifying in benefit a medical intervention. While this is an important component missing at present, it could be undertaken in an expanded version of the model.

Key performance indicators that can be compared locally and internationally have been developed.

The model is now ready to be examined by the sector and service users to ensure service preferences and gaps are identified well in advance.

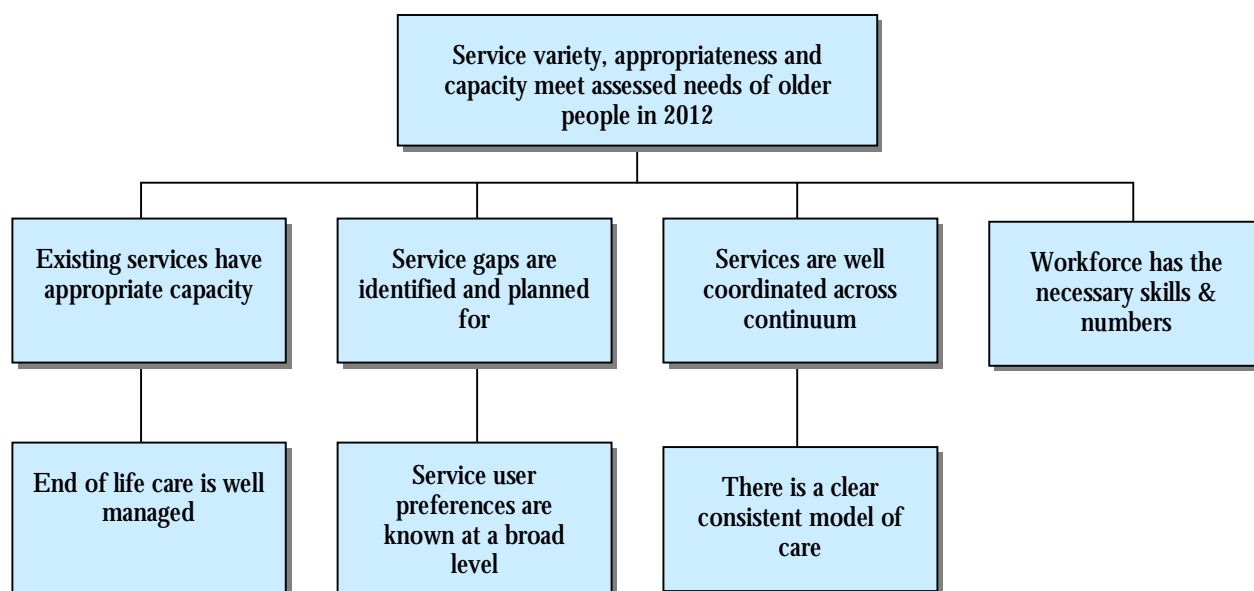


3. Objectives and Outcomes

System modelling is a part of CMDHB's Older People's Strategy to plan future services for older people

- § By developing a system dynamic model focusing on the coordination and integration across the continuum of services
- § To ensure the variety and capacity of services meet their assessed needs.

3.1 Outcomes



4. Values

The core values for health and disability support programmes are that they¹:

- § Relate to older people's services in the community and throughout the DHB
- § Foster a positive attitude to growing older
- § Work within the framework of the Treaty of Waitangi to address issues for Māori
- § Use a holistic, person-centred approach that promotes wellness and participation
- § Provide information to enable older people, carers, family and/or whānau to make informed choices about their health and wellbeing
- § Support carers in ways that strengthen the older person's family, whānau and informal support networks

¹ All but the first value are from the National Health of Older People Strategy

- § Work with other key sectors to reduce barriers to positive ageing and increase service integration for the benefit of older people
- § Recognise and respond to cultural and social diversity and health inequalities, among Pacific and other ethnic and social groups
- § Provide timely, equitable, needs-based access to comprehensive and integrated care that is good quality and responsive to changing needs
- § Provide appropriately for older people who are disadvantaged through ill health, difficulty accessing services, or socioeconomic circumstances
- § Encourage people to take responsibility for preserving their health through a healthy lifestyle
- § Respond to changing individual and community health needs in ways that are innovative, collaborative and flexible
- § Are based on best practice and supported by research
- § Are affordable to the individual as well as the state.

5. Key Variables in the Model

Initially the project focused on the NASC client base with the possibility of:

- § Providing extra carer support for home-based clients (HBC)
- § Enhancing the NASC capacity to assess need
- § Providing education to staff on the importance of maintaining activity in the home for older people, and
- § GP education to ensure they are aware of the NASC and how to refer patients.

Financial eligibility was rejected as a significant variable in the expected future.

To this list was also added some other key variables:

- § Advanced Care planning
- § Increases in community support for AT&R patients and MHSOP clients
- § Increases in beds for AT&R and MHSOP
- § The location of a specific ward for older people within the hospital, staffed by an additional geriatrician and nurse
- § Provision of a community geriatric service
- § Enhanced access to Chronic Care Management (CCM).

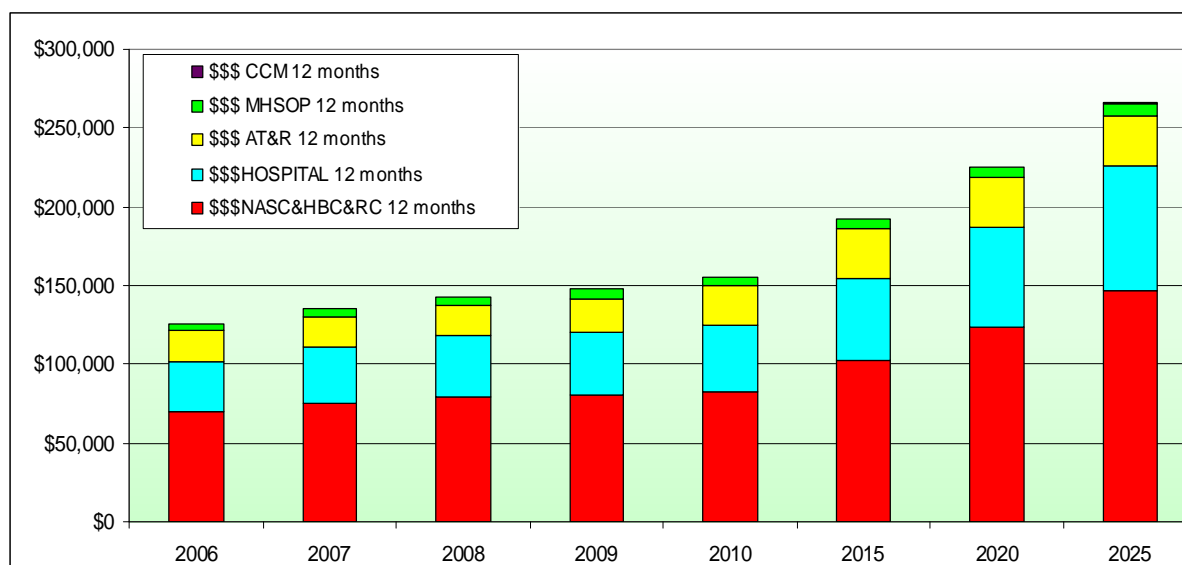
6. Key Information and Assumptions

This section identifies the key assumptions and information used to develop the model. It addresses the individual variables and then combinations of these variables. Key results are highlighted in blue.

6.1 Initial Run

The table below outlines the core performance indicators over the 20 years from 2006 – 2025. All subsequent runs include only those areas that have been impacted by the variable introduced. Note that all the costs have an inflation rate of 2.6% per year.

(Costs in 000) End of Year	2006	2007	2008	2009	2010	2015	2020	2025
Annual costs for NASC&HBC&RC	\$69,890	\$75,225	\$79,527	\$80,431	\$82,416	\$102,913	\$123,199	\$147,277
Annual costs for Hospital	\$31,943	\$35,521	\$38,258	\$40,401	\$42,337	\$51,577	\$63,694	\$78,701
Annual costs for AT&R	\$19,131	\$19,247	\$19,244	\$21,124	\$24,899	\$31,092	\$31,379	\$31,765
Annual costs for MHSOP	\$5,184	\$5,327	\$5,432	\$5,537	\$5,639	\$6,221	\$6,934	\$7,840
Annual costs for CCM	\$58	\$60	\$65	\$70	\$75	\$97	\$121	\$151
Annual costs for HOP (NASC&HBC&RC+AT&R)	\$89,188	\$94,472	\$98,770	\$101,556	\$107,316	\$134,005	\$154,578	\$179,042
Total annual costs	\$126,534	\$135,380	\$142,525	\$147,563	\$155,367	\$191,900	\$225,327	\$265,733
Population aged over 65	41,495	43,378	45,348	47,406	49,558	61,875	77,254	96,454
AT&R Inpatient not served	23	30	37	18	0	16	75	135
AT&R Inpatients	1,408	1,420	1,417	1,570	1,859	2,303	2,302	2,311
AT&R Outpatient clients	1,012	1,071	1,127	1,180	1,243	1,531	1,916	2,400
AT&R community clients	1,668	1,785	1,887	1,981	2,074	2,529	3,185	3,958
AT&R actual beds	62	62	62	75	101	101	101	101
AT&R beds required	10	16	16	3	-14	2	33	56
NASC total new referrals	167	178	194	208	219	283	300	366
NASC new clients having waited to be assessed	72	19	0	0	0	0	0	0
HBC & RC Total Clients	5,517	6,044	6,389	6,702	7,131	8,557	10,626	13,127
HBC clients	3,983	4,408	4,721	5,054	5,397	6,417	8,091	10,170
RC clients	1,534	1,635	1,668	1,648	1,734	2,140	2,535	2,957
Flow from HBC to RC	354	402	412	421	444	492	510	532
Hospital EC NASC clients	521	577	613	649	666	807	1,002	1,238
Hospital Wards NASC clients	102	114	122	128	132	160	199	244
MHSOP community clients	541	583	618	647	685	870	1,100	1,399
MHSOP Inpatients	163	162	162	162	162	162	162	162
MHSOP actual beds	14	14	14	14	14	14	14	14
MHSOP beds required	9	11	11	13	13	20	27	39
MHSOP monthly referrals received	85	91	94	98	100	125	151	196
CCM NASC total clients	344	367	396	426	458	583	729	909
Additional AT&R Community staff needed	0.9	1.5	2.0	2.6	3.4	6.2	10.6	15.7
Additional AT&R Outpatient staff needed	0.0	0.0	0.0	0.1	0.1	0.2	0.5	0.8
Additional AT&R Inpatient staff needed	0.0	0.0	1.2	20.1	43.7	61.2	57.4	60.2
Additional HBC staff needed	0.0	22.5	99.7	182.3	267.0	519.5	933.5	1447.8
Additional RC staff needed	0.0	14.3	25.4	18.4	47.4	183.5	315.9	457.5
Additional MHSOP Community staff needed	4.3	6.6	8.6	10.2	12.3	22.7	35.6	52.4
Additional MHSOP Inpatient staff needed	-0.8	-0.6	-0.6	-0.5	-0.6	-0.7	-0.8	-0.8
Additional NASC assessment FTE needed	13.7	10.2	8.1	8.4	9.0	13.2	11.1	14.9
NASC total assessment FTE staff	24.9	25.9	27.6	29.6	31.2	36.6	47.0	56.9



6.2 Enhancing NASC Capacity to Assess Need

Assumptions	<ul style="list-style-type: none"> § If NASC has the human resource to undertake all initial assessments early, clients access the appropriate supports they need to “age in place”. This investment is included in the initial basic run. § If NASC has sufficient staff to (re)assess all clients, more people will be able to receive appropriate resources and remain in home-based care. The NASC staff for (re)assessment has been adjusted to maintain the NASC waiting list at 0. On average 1 extra FTE is allocated every year.
Key Information	<ul style="list-style-type: none"> § There are about 160 new referrals a month to NASC § Waiting times for people prior to assessment: <ul style="list-style-type: none"> § High Need (includes high and very high need): 54% of all referrals=12 days § Medium Need: 28% =16 days § Low Need: 18% = 19 days § 28% (26–30%) of referrals are declined or withdrawn § 30% of clients are over 85 § Reassessments ideally occur three yearly for people in residential care and people with low needs in community care. They should be annually undertaken for HBC clients with medium or high needs § Further details on the client profile are in Appendix 3

The table below shows that there are initially higher costs are incurred with more NASC staff although small savings (\$1 million) are made in the longer term.

(Costs in 000) End of Year	2006	2007	2008	2009	2010	2015	2020	2025
Annual costs for NASC&HBC&RC	\$71,549	\$79,224	\$83,736	\$83,057	\$85,115	\$101,741	\$122,254	\$146,523
Total annual costs	\$128,679	\$141,733	\$149,337	\$152,530	\$160,430	\$190,422	\$224,090	\$264,725
NASC new clients having waited to be assessed	72	19	0	0	0	0	0	0
HBC & RC total Clients	5,804	6,449	6,775	7,049	7,464	8,515	10,593	13,091
HBC clients	4,232	4,755	5,063	5,396	5,667	6,427	8,099	10,180
RC clients	1,572	1,694	1,713	1,653	1,797	2,088	2,495	2,911
Flow from HBC to RC	336	398	412	425	445	464	491	507
Additional HBC staff needed	0.0	108.3	184.4	266.8	333.8	521.9	935.4	1450.2
Additional RC staff needed	0.0	34.0	40.3	20.3	68.6	166.1	302.5	442.2
Additional NASC assessment FTE needed	4.3	-1.2	-2.4	-1.1	0.0	2.5	2.1	1.6
NASC total assessment FTE staff	38.4	38.6	39.4	40.4	41.4	47.2	55.9	70.1

6.3 Providing Extra Carer Support for Home-based Clients (HBC)

<p>Assumptions</p>	<ul style="list-style-type: none"> § \$1M additional expenditure on carer support (e.g. day services, respite) allows 40, 60 or 80 initial referrals a year to go to home-based care as opposed to residential care in one year. 60 accepted in combination scenarios. § This increases the average spend on HBC per person from \$2,905 to \$2,945 per year (i.e. from \$242 to \$272 a month). § There will be a delay in impact of 6 months after investment. § For investment over \$3M, there will be a gradual change of ALOS for HBC and Residential Care (RC) clients. HBC ALOS increases from 55 months to 62 months, whereas RC ALOS drops from 27 months to 22 months. Movement from HBC to RC is currently about 10% of HBC clients a year; this will drop to 6% over 20-year period, as the length of time in residential care decreases with better home support. § The current asset limit for residential care is \$170,000 and will rise by \$10,000 a year. This will not impact on people’s decision to get residential care.
<p>Key Information</p>	<ul style="list-style-type: none"> § The number of NASC active clients in December 2005 was 5,300 § There were roughly 2,500 RC and 5,000 HBC clients receiving service from CMDHB throughout 2007. § Average cost of RC is \$3,276 per month. <ul style="list-style-type: none"> § 27% (25-29%) of initial referrals go to residential care. § ALOS = 27-30 months. § Average cost of HBC is \$242 per month. <ul style="list-style-type: none"> § 73% (71-75%) of all new clients receive home-based care. § ALOS = 53-57 months. § 326 received both RC and HBC services in a year.

The table below shows that unless 60 people are retained in the community for each million invested there are no long-term savings. This is because high levels of home support have been included to ensure people with high needs are adequately supported.

(Costs in 000) End of Year	2006	2007	2008	2009	2010	2015	2020	2025
Base Run	\$126,534	\$135,380	\$142,525	\$147,563	\$155,367	\$191,900	\$225,327	\$265,733
Total annual costs (\$1 million, 40 retained in community)	\$127,305	\$134,810	\$140,274	\$144,893	\$153,400	\$192,069	\$225,172	\$265,409
Total annual costs (\$1 million, 60 retained in community)	\$127,231	\$134,029	\$138,657	\$143,066	\$151,915	\$191,670	\$224,608	\$264,756
Total annual costs (\$1 million, 80 retained in community)	\$127,158	\$133,252	\$137,047	\$141,246	\$150,432	\$191,252	\$224,054	\$264,084
Total annual costs (\$3 million, 60 retained in community)	\$126,483	\$123,931	\$125,411	\$130,222	\$140,146	\$185,948	\$216,298	\$248,298
Total annual costs (\$5 million, 60 retained in community)	\$127,894	\$121,397	\$118,089	\$122,522	\$134,338	\$186,034	\$215,700	\$247,891

6.4 Providing Education to HBC Staff on the Importance of Maintaining Activity in the Home for Older People

Assumptions	<p>§ \$300K investment will decrease 0.87% of total NASC clients assessed going to residential care after initial assessment (this is 1–2 clients a month). Clients will stay longer (2–4 weeks) in home-based care, and shorter (7–21 days) in residential care.</p> <p>§ Only 2/3 of the initial investment needs to be retained after the first year. An ongoing investment will be \$200K for the following years.</p> <p>§ There will be a one-year delay for the effects of this investment.</p> <p>§ Under this assumption, the investment is repaid in 24 months. This investment is included in the initial basic run.</p>
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6.5 Primary Care Education to Ensure They are Aware of NASC and How to Refer Patients

Assumptions	<p>§ For every \$10,000 spent on primary care education, an extra 1% of patients are referred to NASC on top of GP current referral rates each month.</p> <p>§ The time delay for the impact of this assumption is 3 months.</p>
Key Information	<p>§ Currently 2.8% of the total population aged 65 and over receive referrals to NASC by primary care (GPs).</p> <p>§ People over 65 average 5 visits to GPs a year.</p> <p>§ If people are over 75, referrals should be made to NASC.</p>

The table below shows that there is very little impact on the costs or delivery of service with this service. It is assumed that there is some enhancement of the quality of life of potential clients because of primary care awareness of support services.

(Costs in 000) End of Year	2006	2007	2008	2009	2010	2015	2020	2025
Base Run	\$126,534	\$135,380	\$142,525	\$147,563	\$155,367	\$191,900	\$225,327	\$265,733
Total annual costs	\$126,553	\$135,407	\$142,682	\$147,905	\$155,760	\$191,999	\$225,302	\$265,730

6.6 Increase Advanced Care Planning to Limit Unnecessary Medical Intervention

Assumptions	<p>§ Having an Advanced Care Plan reduces older people’s ALOS from between 0.3 day (7.2 hours or 0.01 month) for each person, to 0.6 day (14.4 hours, 0.02 month).</p> <p>§ All older people have an Advanced Care Plan developed.</p>
Key Information	<p>§ 23% of NASC clients and 29% of non-NASC population aged 65+ went to hospital in 2006 (5,300 people or 11,078 visits – total over 65).</p> <p>§ 13% of hospital non-NASC clients become NASC clients after hospital treatment.</p> <p>§ GPs provide half of all referrals to EC.</p> <p>§ Of all hospital visits, 76% go to EC (61% acute, 15% arrange acute) and 24% directly go to the ward. 92% of EC patients transfer to ward.</p> <p>§ Average cost:</p> <ul style="list-style-type: none"> § Acute Care = \$4,635 per episode § Acute arranged = \$6,586 per episode § Elective = \$4,086 per episode § Combined = \$4,801 per episode <p>§ ALOS:</p> <ul style="list-style-type: none"> § 5days Acute, 9 days Acute arranged, 2 days elective surgery

The table below shows the high level of impact on the hospital and therefore overall costs for older people. Even with 7 hours reduced for all NASC clients, there is a saving of nearly \$2 million in the first year and nearly \$5 million by year 20.

(Costs in 000) End of Year	2006	2007	2008	2009	2010	2015	2020	2025
Annual costs for Hospital (7.2 hours)	\$30,187	\$33,245	\$36,142	\$37,963	\$39,897	\$48,418	\$59,939	\$73,755
Total annual costs (7.2 hours)	\$124,778	\$133,104	\$140,408	\$145,125	\$152,927	\$188,741	\$221,571	\$260,787
Annual costs for Hospital (14.4 hours)	\$28,536	\$31,109	\$33,661	\$35,543	\$37,344	\$45,309	\$55,953	\$69,199
Total annual costs (14.4 hours)	\$123,128	\$130,968	\$137,928	\$142,705	\$150,373	\$185,632	\$217,586	\$256,231

6.7 The Reorganisation of a Specific Ward for Older People Within the Hospital, Staffed by an Additional Geriatrician and Nurse

Assumptions	§ With a geriatrician in a short-term unit, the ALOS for NASC clients in hospital reduces by between 0.1, 0.3, 0.5 days.
Key Information	§ A geriatrician will cost \$220K.

The table below shows the impact on costs simply with reduced ALOS from having a specialised ward for older people. If 30% of one day is reduced on NASC clients in hospital, a saving of \$5 million is made.

(Costs in 000) End of Year	2006	2007	2008	2009	2010	2015	2020	2025
Annual costs for Hospital (0.1 day less ALOS)	\$31,548	\$35,025	\$37,704	\$39,805	\$41,702	\$50,756	\$62,628	\$77,330
Total annual costs (0.1 day less ALOS)	\$126,140	\$134,884	\$141,971	\$146,968	\$154,731	\$191,079	\$224,260	\$264,362
Annual costs for Hospital ((0.3 day less ALOS)	\$30,542	\$33,595	\$36,211	\$38,121	\$39,954	\$48,943	\$59,774	\$73,727
Total annual costs (0.3 day less ALOS)	\$125,133	\$133,454	\$140,477	\$145,284	\$152,983	\$189,266	\$221,407	\$260,759
Annual costs for Hospital (0.5 day less ALOS)	\$29,305	\$32,175	\$34,620	\$36,550	\$38,287	\$46,601	\$57,489	\$70,971
Total annual costs (0.5 day less ALOS)	\$123,896	\$132,034	\$138,887	\$143,713	\$151,316	\$186,924	\$219,121	\$258,003

6.8 Increase the Provision of Community Geriatric Service

Assumptions	§ For every Community Geriatrician and specialist nurse based in the community to support rest homes and GPs, there are 1%, 2% or 3% less visits (110, 220, 330 per year) to hospital. Two geriatricians and nurses have been costed. § The time delay for the impact of this assumption is 3 months.
Key Information	§ The cost of a geriatrician and specialist nurse is \$310K.

The table below shows that 2 community geriatricians and nurses save little if they are reducing visits by only 1%. If reducing hospital visits of NASC clients by 3%, \$2.5 million is saved by year 20.

(Costs in 000) End of Year		2006	2007	2008	2009	2010	2015	2020	2025
2 geriatricians/nurses reducing hospital visits by NASC clients by 1%	Annual costs for Hospital	\$31,347	\$34,471	\$37,212	\$39,352	\$41,290	\$50,529	\$62,647	\$77,654
	Annual costs for AT&R	\$19,700	\$19,868	\$19,865	\$21,746	\$25,521	\$31,714	\$32,001	\$32,386
	Total annual costs	\$126,508	\$134,952	\$142,100	\$147,136	\$154,941	\$191,473	\$224,901	\$265,308
	Hospital EC NASC clients	502	559	595	631	647	789	984	1,219
	Hospital Wards NASC clients	99	111	119	125	129	157	196	241
2 geriatricians/nurses reducing hospital visits by NASC clients by 2%	Annual costs for Hospital	\$30,750	\$33,422	\$36,167	\$38,303	\$40,244	\$49,481	\$61,599	\$76,607
	Annual costs for AT&R	\$19,700	\$19,868	\$19,865	\$21,746	\$25,521	\$31,714	\$32,001	\$32,386
	Total annual costs	\$125,912	\$133,902	\$141,054	\$146,087	\$153,894	\$190,425	\$223,853	\$264,261
	Hospital EC NASC clients	484	540	577	613	629	770	966	1,201
	Hospital Wards NASC clients	96	108	116	122	126	154	193	238
2 geriatricians/nurses reducing hospital visits by NASC clients by 3%	Annual costs for Hospital	\$30,154	\$32,373	\$35,121	\$37,255	\$39,197	\$48,432	\$60,552	\$75,561
	Annual costs for AT&R	\$19,700	\$19,868	\$19,865	\$21,746	\$25,521	\$31,714	\$32,001	\$32,386
	Total annual costs	\$125,315	\$132,853	\$140,009	\$145,039	\$152,847	\$189,376	\$222,806	\$263,214
	Hospital EC NASC clients	466	522	558	594	611	752	947	1,183
	Hospital Wards NASC clients	93	104	113	118	123	150	189	235

6.9 Increase in Inpatient Beds for AT&R

<p>Assumptions</p>	<p>§ With 14 more AT&R beds available in the hospital, entry is delayed to Residential Care for 7 people for one month, i.e. two extra beds hold one client one month longer in Home-based Care.</p> <p>§ The additional beds (see below) are included in the initial basic run. 1,400 clients use these beds a year.</p>								
<p>Key Information</p>	<p>§ There are currently 62 AT&R beds, excluding long stay hospital beds that are not focused on rehabilitation:</p> <table border="1" data-bbox="555 685 1086 853"> <tr> <td>Ward 24</td> <td>28</td> </tr> <tr> <td>Ward 23</td> <td>15 (for old people)</td> </tr> <tr> <td>Ward 22a</td> <td>13</td> </tr> <tr> <td>Pukekohe-Franklin</td> <td>5-8</td> </tr> </table> <p>§ An additional 13 beds have already been commissioned for 2009.</p> <p>§ A further additional 26 beds have already been commissioned for 2010.</p> <p>§ 60% of people in AT&R wards are NASC clients, and 76% of these are from HBC.</p> <p>§ ALOS = 14-15 days (HBC InPatient 16 days, RC InPatient 58 days).</p> <p>§ Cost of the bed is \$645 per day (including medical staff) and \$539 without medical staff.</p> <p>§ The average inpatient cost is \$13,025 per episode.</p>	Ward 24	28	Ward 23	15 (for old people)	Ward 22a	13	Pukekohe-Franklin	5-8
Ward 24	28								
Ward 23	15 (for old people)								
Ward 22a	13								
Pukekohe-Franklin	5-8								

6.10 Increase in Community Support for AT&R Patients

<p>Assumptions</p>	<ul style="list-style-type: none"> § \$100,000 increase in community services reduces demand for inpatient beds by 17 people a year. A third of these increased community clients can be supported in outpatient services and the other two thirds can be supported in their own homes through the community service. This will provide 1.5 therapists, at a cost of \$67,000 per therapist. § There is a 3-month delay in the impact of this assumption. § Funds will be invested from 2016 when bed capacity is again challenged; scenarios use \$500,000, \$2 million and an increasing investment up to \$9 million.
<p>Key Information</p>	<ul style="list-style-type: none"> § NASC clients constitute 30% of AT&R community clients. § NASC client repeat rate is slightly more than non-NASC clients: 5.4 vs 4.4. § ALOS is around 90 days. § The average cost of community support is \$337 per contact (215 clients and 1,046 contacts).

The table below shows that despite higher AT&R costs, significantly more people can be served and considerable savings can be made from supporting people in their own homes and through outpatient clinics.

(Costs in 000) End of Year	2006	2007	2008	2009	2010	2015	2020	2025
Annual costs for AT&R (\$500k)	\$19,131	\$19,247	\$19,244	\$21,124	\$24,899	\$31,373	\$31,961	\$32,196
Total annual costs	\$126,534	\$135,380	\$142,525	\$147,563	\$155,367	\$192,180	\$225,908	\$266,164
AT&R community clients	1,012	1,071	1,127	1,180	1,243	1,565	1,973	2,457
AT&R outpatients	1,668	1,785	1,887	1,981	2,074	2,546	3,213	3,986
Annual costs for AT&R (\$2 million)	\$19,131	\$19,247	\$19,244	\$21,124	\$24,899	\$31,760	\$33,299	\$33,758
Total annual costs	\$126,534	\$135,380	\$142,525	\$147,563	\$155,367	\$192,568	\$227,246	\$267,726
AT&R community clients	1,012	1,071	1,127	1,180	1,243	1,667	2,143	2,627
AT&R outpatients	1,668	1,785	1,887	1,981	2,074	2,598	3,298	4,071
Annual costs for AT&R (\$9 million)	\$19,131	\$19,247	\$19,244	\$21,124	\$24,899	\$31,756	\$35,094	\$40,008
Total annual costs	\$126,534	\$135,380	\$142,525	\$147,563	\$155,367	\$192,563	\$229,041	\$273,976
AT&R community clients	1,012	1,071	1,127	1,180	1,243	1,660	2,541	3,375
AT&R outpatients	1,668	1,785	1,887	1,981	2,074	2,594	3,497	4,445

6.11 Increase in Community Support for MHSOP Clients

Assumptions	<p>§ For every \$90,000 spent on additional community support per year (e.g. CSW or day services), 8 clients per year are maintained in the community (i.e. do not go to RC).</p> <p>§ The time delay for the impact of this assumption is 3 months.</p> <p>§ An additional \$1 million and \$2 million are included in the scenarios.</p>
Key Information	<p>§ MHSOP focuses on community-based services. They support 695 clients a year (5,823 contacts, repeat rate 8.4).</p> <p>§ 58% of community clients (56% contacts) are from NASC. Repeat rates for NASC and non-NASC clients are similar (8.1 vs 8.8).</p> <p>§ ALOS is 211 days.</p> <p>§ MHSOP has estimated that 20% of current clients who would need some form of day care are not receiving this, for example due to geographical issues, current services not being appropriate, or their presenting behaviours making them inappropriate for existing services.</p> <p>§ The cost is \$247 per contact.</p>

The table below shows that significant numbers of people can be maintained in their own homes and savings made over time, despite initial higher costs.

(Costs in 000) End of Year	2006	2007	2008	2009	2010	2015	2020	2025
Annual costs for MHSOP (\$1 million)	\$6,100	\$6,315	\$6,407	\$6,509	\$6,610	\$7,187	\$7,900	\$8,806
Total annual costs	\$126,922	\$133,467	\$138,015	\$142,298	\$149,846	\$185,484	\$219,053	\$259,234
Population aged over 65	41,495	43,378	45,348	47,406	49,558	61,875	77,254	96,454
Flow from HBC to RC	288	316	326	335	357	405	423	445
Annual costs for MHSOP (\$2 million)	\$7,017	\$7,303	\$7,382	\$7,481	\$7,580	\$8,153	\$8,866	\$9,771
Total annual costs	\$127,309	\$131,554	\$133,505	\$137,028	\$144,331	\$179,071	\$212,777	\$252,752
Population aged over 65	41,495	43,378	45,348	47,406	49,558	61,875	77,254	96,454
Flow from HBC to RC	223	229	239	248	271	319	337	357

6.12 Enhanced Access to Chronic Care Management (CCM)

<p>Assumptions</p>	<ul style="list-style-type: none"> § For every NASC client using CCM (currently costing \$169 per year, with 2.6% increase every year) there is 1 less visit to hospital a year. § An increase in CCM usage by NASC clients will result in longer stays in the community. 2% of CCM/NASC clients stay in HBC for 6 months longer. § CCM % of NASC clients will increase by 10% or 50%. 														
<p>Key Information</p>	<ul style="list-style-type: none"> § There are 722 NASC clients (118 have used RC) in the CCM programme. 157 have been declined. This amounts to 19% of all HBC clients, and 8% of all RC clients in the programme. § There are only 10 RC new referrals in a year, and 145 referrals from HBC. § There is no current limit on the number of patients CCM take, as long as they qualify, but if the numbers of people were to rise significantly a limit may be established. It is a free service for clients, with a limited number of visits to the GP per person (minimum 4 times a year). There is evidence that this programme does lengthen clients' lives. <table border="1" data-bbox="536 1093 1310 1447" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>CCM Programme</th> <th>ALOS (months)</th> </tr> </thead> <tbody> <tr> <td>Chronic Heart Failure</td> <td>22</td> </tr> <tr> <td>Chronic Obstructive Pulmonary Disease</td> <td>20</td> </tr> <tr> <td>Chronic Vascular Disease</td> <td>19</td> </tr> <tr> <td>Depression</td> <td>8</td> </tr> <tr> <td>Diabetes</td> <td>36</td> </tr> <tr> <td>Other (FAMA)</td> <td>8</td> </tr> </tbody> </table>	CCM Programme	ALOS (months)	Chronic Heart Failure	22	Chronic Obstructive Pulmonary Disease	20	Chronic Vascular Disease	19	Depression	8	Diabetes	36	Other (FAMA)	8
CCM Programme	ALOS (months)														
Chronic Heart Failure	22														
Chronic Obstructive Pulmonary Disease	20														
Chronic Vascular Disease	19														
Depression	8														
Diabetes	36														
Other (FAMA)	8														

The following table shows that there is little financial impact from the increase in CCM service although the impact on quality of life may be high.

(Costs in 000) End of Year	2006	2007	2008	2009	2010	2015	2020	2025
Annual costs for CCM (10% increase in NASC clients)	\$59	\$63	\$69	\$75	\$81	\$106	\$133	\$166
Total annual costs	\$126,508	\$135,292	\$142,385	\$147,384	\$155,157	\$191,594	\$224,940	\$265,249
CCM NASC total clients	356	388	425	462	499	641	801	1,000
Annual costs for CCM (50% increase in NASC clients)	\$63	\$74	\$86	\$97	\$107	\$144	\$181	\$226
Total annual costs	\$126,402	\$134,941	\$141,827	\$146,666	\$154,320	\$190,369	\$223,394	\$263,313
CCM NASC total clients	404	476	543	604	663	871	1,092	1,363

6.13 Staffing

Assumption	There will be a three-month delay for staff training before operating at full capacity.
Key Information	<p>NASC</p> <ul style="list-style-type: none"> § Per NASC staff FTE = 227 reassessments a year. § Per NASC staff FTE = 154 assessments a year. § 29 total staff and 20.2 involved in assessment. § The current NASC operational cost is \$1.56M for 20.2 FTE or \$77K per FTE. <p>MHSOP</p> <ul style="list-style-type: none"> § 30 people (26 FTE) in the service including nursing, Clinical Nurse Specialist, psychiatry, allied health and administration in 2 community teams. § Ward 22 (MHSOP) has 19 FTE nursing staff (registered and non-registered) plus a Charge Nurse with 1.5 admin. <p>AT&R</p> <ul style="list-style-type: none"> § 115 staff are employed by AT&R, with 96.75 FTE. <p>Community-based Staff (residential and other support services)</p> <ul style="list-style-type: none"> § Estimated 1,600 FTE for both HBC and RC (CMDHB WDP). § 2/3 are in HBC (1068 FTE) 1/3 are employed in RC (534)

	Clients	Episodes	FTE	FTE/Episode
HBC	4,907		1,068	21.8%
RC	2,389		5,34	22.4%
NASC Assessment	162		20.2	8%
MHSOP Inpatient	104	129	26	20.2%
MHSOP Community	695	5,823	20.5	0.4%
AT&R Community	215	1046	10	0.96%
AT&R Outpatient	1344	1790	0.6	0.03%
AT&R Inpatient	1,000	1,254	96.75	7.7%

7. Combination Scenarios

Three combinations of all the scenarios have been developed. Identified in the tables below are the overall costs, the numbers of people in residential and home-based care and the impact on each of the workforces.

As can be seen, even in the worst case, there are more people maintained in their own home than without any of the scenarios and cost savings made immediately.

7.1 Worst Case

All the most conservative interpretations of the variables have been included:

(Costs in 000) End of Year	2006	2007	2008	2009	2010	2015	2020	2025
Total annual costs	\$125,137	\$129,046	\$132,035	\$135,928	\$144,137	\$180,637	\$213,069	\$251,383
HBC & RC total Clients	5,500	5,969	6,288	6,649	7,121	8,543	10,612	13,110
RC clients	1,474	1,475	1,429	1,415	1,500	1,919	2,306	2,723
Additional AT&R Community staff needed	0.9	1.5	2.0	2.7	3.4	6.8	11.3	16.4
Additional AT&R Outpatient staff needed	0.0	0.0	0.0	0.1	0.1	0.2	0.5	0.8
Additional AT&R Inpatient staff needed	0.0	0.0	1.2	20.0	43.6	59.9	58.3	61.2
Additional HBC staff needed	-72.2	43.6	133.9	226.9	322.4	570.7	986.6	1,501.4
Additional RC staff needed	-39.7	-39.4	-54.8	-59.6	-31.0	109.4	239.4	379.1
Additional MHSOP Community staff needed	4.2	6.2	7.9	9.5	11.7	22.2	35.0	51.7
Additional MHSOP Inpatient staff needed	-0.8	-0.6	-0.6	-0.5	-0.6	-0.7	-0.8	-0.8
NASC total assessment FTE staff	24.9	25.9	27.6	29.6	31.2	36.6	47.0	56.9

7.2 Most Likely

All the moderate interpretations of the variables have been included:

(Costs in 000) End of Year	2006	2007	2008	2009	2010	2015	2020	2025
Total annual costs	\$123,215	\$116,925	\$116,178	\$120,469	\$130,013	\$173,084	\$203,270	\$234,016
HBC & RC total Clients	5,375	5,695	6,170	6,640	7,278	8,862	10,978	13,527
RC clients	1,306	1,042	1,037	1,015	1,103	1,588	1,911	2,117
Additional AT&R Community staff needed	0.9	1.5	2.1	2.8	3.6	8.5	13.4	18.6
Additional AT&R Outpatient staff needed	0.0	0.0	0.0	0.1	0.1	0.3	0.5	0.8
Additional AT&R Inpatient staff needed	0.0	0.0	1.2	19.4	44.5	55.1	61.2	61.3
Additional HBC staff needed	-61.5	82.9	201.9	323.4	459.5	731.4	1,174.7	1,754.3
Additional RC staff needed	-95.9	-184.5	-186.4	-193.5	-164.1	-1.5	107.0	176.0
Additional MHSOP Community staff needed	3.9	4.9	6.7	8.4	10.8	22.0	34.7	50.9
Additional MHSOP Inpatient staff needed	-0.8	-0.6	-0.6	-0.5	-0.6	-0.7	-0.8	-0.8
Additional NASC assessment FTE needed	24.9	25.9	27.6	29.6	31.2	36.6	47.0	56.9
NASC total assessment FTE staff	\$123,215	\$116,925	\$116,178	\$120,469	\$130,013	\$173,084	\$203,270	\$234,016

7.3 Best Case

All the most optimistic interpretations of the variables have been included:

(Costs in 000) End of Year	2006	2007	2008	2009	2010	2015	2020	2025
Total annual costs	\$123,981	\$116,003	\$108,803	\$108,939	\$119,298	\$158,521	\$189,538	\$223,648
HBC & RC total Clients	5,661	6,075	6,503	7,054	7,774	9,084	11,222	13,795
RC clients	1,276	871	699	643	783	1,236	1,562	1,777
Additional AT&R Community staff needed	1.1	1.7	2.4	3.1	4.0	8.6	18.1	26.9
Additional AT&R Outpatient staff needed	0.0	0.0	0.0	0.1	0.1	0.3	0.6	0.9
Additional AT&R Inpatient staff needed	0.0	0.0	1.2	20.2	46.6	57.4	51.5	60.3
Additional HBC staff needed	16.8	219.3	367.7	517.8	661.5	873.2	1,321.6	1,905.1
Additional RC staff needed	-106.3	-242.1	-299.6	-318.2	-271.5	-119.5	-10.2	61.7
Additional MHSOP Community staff needed	4.1	5.3	6.5	8.1	10.8	21.5	34.2	50.5
Additional MHSOP Inpatient staff needed	-0.8	-0.6	-0.6	-0.5	-0.6	-0.7	-0.8	-0.8
NASC total assessment FTE staff	38.4	38.6	39.4	40.4	41.4	47.2	55.9	70.1

8. Key Performance Indicators

The following indicators could allow benchmarking with this model locally or internationally. Selection of the most important five or six would make this more manageable.

Annual costs for NASC, HBC & RC / per client served
Annual costs for Hospital / per client served
Annual costs for AT&R / per client served
Annual costs for MHSOP / per client served
Annual costs for CCM /per client served
Total annual costs for Older People per client served
Population aged over 65
AT&R Inpatients per population
AT&R Outpatient clients per population
AT&R community clients per population
AT&R actual beds per population
HBC & RC total Clients per population
HBC clients per population
RC clients per population
Hospital EC NASC clients per population
Hospital Wards NASC clients per population
MHSOP community clients per population
MHSOP Inpatients per population
MHSOP actual beds per population
CCM NASC total clients per population
Total AT&R Community staff
Total AT&R Inpatient staff
Total HBC staff
Total RC staff
Total MHSOP Community staff
Total MHSOP Inpatient staff
Total NASC assessment FTE
Satisfaction with Service from service users and their families

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Appendix 2: Glossary

ALOS	Average Length of Stay
AT&R	Assessment Treatment and Rehabilitation
CCM	Chronic Care Management
DSS	Disability Support Service
EC	Emergency Care
EPOA	Enduring Power of Attorney
FAMA	Frequent Adult Medical Admissions
FTE	Full-Time Equivalent
HBC	Home-Based Clients
HOP	Health of Older People
MHSOP	Mental Health Services for Older People
NASC	Needs Assessment and Service Coordination
QALY	Quality-Adjusted Life Years
RC	Residential Care
WDP	Workforce Development Plan

Appendix 3: NASC Client Profile

The following tables were compiled from 2006/7 Client Data:

NASC Client Need by Age				
Age Band	Assessment Grade			
	Low	Med	High	V High
<50	6%	13%	13%	69%
50-64	9%	12%	46%	33%
65-74	17%	31%	35%	17%
75-84	23%	30%	31%	17%
85-94	15%	27%	37%	21%
95+	4%	20%	41%	35%
% of total	18%	28%	34%	19%

NASC Client Ethnicity and Need							
Assessment Grade	Asian	European	Not Stated	NZ Māori	Other	Pacific Island	Grand Total
Low	7%	20%	18%	14%	23%	7%	18%
Medium	30%	29%	27%	25%	34%	17%	28%
High	38%	31%	30%	39%	25%	51%	33%
V High	24%	18%	22%	23%	16%	24%	19%
Grand Total	4%	71%	9%	5%	2%	10%	100%
% of high & very high needs	62%	49%	52%	61%	41%	75%	53%
% of medium high & very high needs	92%	78%	79%	86%	76%	93%	81%

Gender and Age of NASC Clients						
Age Band	Female	%	Male	%	Grand Total	%
<50	9	56%	7	44%	16	0%
50-64	39	50%	39	50%	78	1%
65-74	629	63%	377	37%	1,006	18%
75-84	1,691	67%	822	33%	2,514	44%
85-94	1,314	73%	489	27%	1,803	32%
95+	238	79%	62	21%	301	5%
Grand Total	3,921	69%	1,797	31%	5,720	100%

NASC Client Service Usage by Need		
Assessment Grade	Home-based Care	Residential Care
Low	1,096	14
	99%	1%
Med	2,012	117
	95%	5%
High	1,817	858
	6,8%	32%
V High	457	916
	33%	67%
Grand Total	5,473	1,906
	74%	26%

Deductions from Data

- § Māori, Pacific and Asian have the youngest populations in need
- § Māori, Pacific and Asian have the lowest representation
- § Europeans have the greatest take-up rates
- § Pacific, Asian and Māori have the highest-need populations
- § Pacific, Asian and Māori present later than Europeans
- § All ethnic groups have similar gender structures
- § Women are living longer and have higher needs